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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/489,515	01/21/2000	Surya Prakash	06618-408001	5938

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EXAMINER

MERCADO, JULIAN A

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/489,515	Applicant(s) PRAKASH ET AL.	
	Examiner Julian Mercado	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 11-17 and 19-31 is/are rejected.
- 7) ☐ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 18, 2003 has been entered.

Remarks

Claims 11-31 are pending, of which claims 27-31 are newly submitted.

The rejection of claim 18 under 35 U.S.C. 102(e) based on Cabasso et al. (U.S. Pat. 5,783,325) has been withdrawn.

The rejection of claim 23 under 35 U.S.C. 103(a) based on Cabasso et al. and Kindler. (U.S. Pat. 5,992,008) has been withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11-17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a process of making an electrode for a fuel cell including a membrane

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plasticizer, does not reasonably provide enablement for such a process in which the membrane plasticizer is excluded by the transition phrase "consisting essentially of". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. Applicant's specification discloses the use of the membrane plasticizer to enhance the swelling with water of the membrane so that it may have the desired plasticity when bonded to the electrodes under hot pressing conditions. (page 5 of the specification) Table 1 shows that a membrane plasticizer, DMA, is used for the membrane application on the anode side of the membrane. Thus, applicant's disclosure is not found to adequately enable a process of making an electrode for a fuel cell without the membrane plasticizer.

Of note, the examiner has excluded claim 18 from this ground of rejection. Claim 18 calls for a substrate backing of carbon paper while applicant's disclosure appears to limit the need of a membrane plasticizer for a PSSA-PVDF membrane. (see Table 2 of the specification)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 14 and 15 recite that the ink "further comprises a plasticizer". This limitation is indefinite as it further limits claim 11 which contains the transitional phrase "consisting essentially of".

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Claim Rejections - 35 USC § 102 and 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 12, 14, 15, 17, 19-23 and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Cabasso et al. (U.S. Pat. 5,783,325)

Claims 13 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cabasso et al. as applied to claims 11, 12, 14, 15, 17, 19-23 and 25 above, in view of Scherer et al. (U.S. Pat. 5,656,386)

The above rejections have been discussed in detail in the previous Office action. The prior art rejections are maintained for the reasons of record and for the additional reasons to follow.

Applicant's arguments against Cabasso et al. have been fully considered, however they are not found persuasive.

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Applicant submits that Cabasso et al. does not disclose the process of instant claim 11. However, to the extent that claims 11-17 are believed enabled by applicant's disclosure for the reasons set forth under 35 U.S.C. 112, first paragraph (discussion above), Cabasso et al. is maintained to teach the claimed invention insofar as a catalyst ink for a fuel cell is formed by mixing components of a catalytic material and polyvinylidene fluoride and applying the mixture to a carbon paper substrate. For applicant's claims to be enabled for the reasons set forth above under 35 U.S.C. 112, first paragraph a membrane plasticizer is asserted as required by the process steps. To this extent, and contrary to applicant's attempts to preclude a membrane plasticizer, the examiner notes that claims 14 and 15 call for a membrane plasticizer such as N,N dimethylacetamide. Cabasso et al. is maintained to teach a membrane plasticizer such as N,N dimethylformamide. (col. 7 line 67)

As to the new limitation drawn to the drying step, the catalyst ink is dried on the substrate as it is heated at 250 °C for 1 hour. (col. 10 line 22)

With respect to claims 19-22 and 25, applicant submits that Cabasso et al. does not disclose that the catalyst ink is applied to the membrane. In reply, the examiner maintains that Cabasso et al. teach this feature insofar as the catalyst side of an electrode (which contains the catalyst ink) is applied towards a Nafion membrane via a hot-pressing step. (col. 10 line 26-29) Thus, the catalyst ink is applied to the membrane, and the membrane is bonded to the catalyst ink side of the electrode via the hot-pressing step.

Regarding claim 23, the prior Office action had relied on Kindler to teach a second ionomer comprising a liquid copolymer of tetrafluoroethylene and perfluorovinylethersulfonic acid, e.g. Nafion. Applicant's arguments against Kindler have been fully considered but are

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deemed moot as Cabasso et al. is asserted to teach a Nafion ionomer added to the catalyst ink.

(col. 10 line 27)

(new rejections)

Claim 26 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Cabasso et al.

This ground of rejection is set forth as claim 26 is noted to be in product-by-process format. To this extent, the claimed fuel cell appears to be the same or similar to the prior art product insofar as the catalyst ink is applied to the membrane and the membrane is bonded to the electrode by hot-pressing. In the event that any differences can be shown by the product of the product-by-process claim 26, such differences would have been obvious to the skilled artisan as a routine modification of the product absent of a showing of unexpected results. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Claims 27, 29 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Cabasso et al. (U.S. Pat. 5,783,325)

Claim 27 is rejected for the prior reasons of record as set forth for claims 11, 12, 14, 15, 17, 19-22 and 25. Claim 29 is of similar scope to claim 14 and claim 30 is of similar scope to claim 15. Applicant submits that Cabasso et al. does not disclose that the catalyst ink is applied to a membrane. However, in Cabasso et al., the disclosed carbon paper is considered to be readable on a membrane. This interpretation is not found inconsistent with applicant's

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lexicography and claims, refer to applicant's claims 11, 12, 17 and 18, which call for a membrane substrate of a carbon paper backing.

Claims 16, 24 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cabasso et al. as applied to claims 11, 12, 14, 15, 17, 19-22, 25, 27, 29 and 30 above, in view of Lawrance et al. (U.S. Pat. 4,272,353)

Cabasso does not explicitly teach roughening the surface of the membrane prior to applying the catalyst ink. However, Lawrance et al. teach such a roughening step. (col. 2 line 55-59) While the examiner maintains that the skilled artisan would find such a step obvious for reasons such as increasing the surface area of the membrane, in view of Lawrance et al. a roughening step would be an obvious modification motivated by the enhanced bonding of the catalysts to the membrane support as roughening provides for locking, uniting and fixing of the catalyst particles on the membrane surface.

Applicant's arguments with respect to claims 16, 24 and 31 have been fully considered but are deemed moot in view of the new ground of rejection.

Arguments against Scherer et al. appear to be directed to this reference failing to remedy alleged differences between Cabasso et al. and the present claims. However, in view of Cabasso et al. being maintained for the reasons discussed above, the rejection in view of Scherer is subsequently maintained for reasons already discussed in the previous Office action.

Allowable Subject Matter

Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or reasonably suggest the claimed invention regarding a process of making a fuel cell electrode consisting essentially of a catalyst ink comprising a catalyst material and poly(vinylidene fluoride), applying the catalyst ink to one side of a carbon paper substrate and drying the catalyst ink on the substrate.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Narayanan et al. (U.S. Pat. 5,945,231) is cited as a cumulative and commonly-owned reference.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



jam



Patrick Ryan
Supervisory Patent Examiner
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